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COMMITTEE ON THE PEACEFUL USES
OF OUTER SPACE

REPORT OF THE SCIENTIFIC AND TECHNICAL SUBCOMMITTEE ON THE WORK OF ITS THIRTIETH SESSION

INTRODUCTION

1. The Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space held its thirtieth session at United Nations Headquarters from 16 to 26 February 1993 under the chairmanship of Professor J. H. Carver (Australia).

2. Representatives of the following Member States attended the session: Argentina, Australia, Austria, Belgium, Benin, Brazil, Bulgaria, Burkina Faso, Canada, Chile, China, Colombia, Czech Republic, Ecuador, Egypt, France, Germany, Greece, Hungary, India, Indonesia, Iran (Islamic Republic of), Iraq, Italy, Japan, Kenya, Lebanon, Mexico, Mongolia, Morocco, Netherlands, Nigeria, Pakistan, Philippines, Poland, Romania, Russian Federation, Sierra Leone, Spain, Sweden, Syrian Arab Republic, Ukraine, United Kingdom of Great Britain and Northern Ireland, United States of America, Uruguay, Venezuela and Viet Nam.

3. Representatives of the Department of Economic and Social Development, the Office of Legal Affairs, the United Nations Environment Programme and the United Nations Development Programme of the United Nations Secretariat attended the session.

4. Representatives of the following specialized agencies attended the session: Food and Agriculture Organization of the United Nations (FAO), United Nations Educational, Scientific and Cultural Organization (UNESCO), International Telecommunication Union (ITU), World Meteorological Organization (WMO) and International Atomic Energy Agency (IAEA).

5. Representatives of the European Space Agency (ESA), the International Telecommunications Satellite Organization (INTELSAT), the Committee on Space Research (COSPAR) of the International Council of Scientific Unions (ICSU),

the International Astronautical Federation (IAF) and the International Society for Photogrammetry and Remote Sensing (ISPRS) also attended the session.

6. A list of the representatives of Member States, specialized agencies and other international organizations attending the session is contained in document A/AC.105/C.1/INF/22.

7. On 16 February, the Subcommittee adopted the following agenda:

1. Adoption of the agenda.

2. Statement by the Chairman.

3. General exchange of views.

4. United Nations Programme on Space Applications and the coordination of space activities within the United Nations system.

5. Implementation of the recommendations of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE 82).

6. Matters relating to remote sensing of the Earth by satellites, including, inter alia, applications for developing countries.

7. Use of nuclear power sources in outer space.

8. Questions relating to space transportation systems and their implications for future activities in space.

9. Examination of the physical nature and technical attributes of the geostationary orbit; examination of its utilization and applications, including, inter alia, in the field of space communications, as well as other questions relating to space communications developments, taking particular account of the needs and interests of developing countries.

10. Matters relating to life sciences, including space medicine.

11. Progress in national and international space activities related to the Earth environment, in particular progress in the geosphere-biosphere (global change) programme.

12. Matters relating to planetary exploration.

13. Matters relating to astronomy.

14. The theme fixed for special attention at the 1993 session of the Scientific and Technical Subcommittee: "Space-based communication: the expansion of current services and increased understanding of new systems and the services they will make possible".

15. Other matters.

16. Report to the Committee on the Peaceful Uses of Outer Space.

Meetings and documentation

8. The Subcommittee held 14 meetings.

9. A list of the documents which were before the Subcommittee is provided in annex I to the present report.

10. Following the adoption of the agenda, the Chairman made a statement outlining the work of the Subcommittee at its current session. He also reviewed the activities of Member States in the field of space exploration, including important advances that had been achieved as a result of international cooperation during the past year.

11. At the 417th, 418th, 421st, 422nd, 423rd and 424th meetings, the Chairman informed the Subcommittee that requests had been received from the permanent representatives of Bolivia, Costa Rica, Cuba, Kazakhstan, Libyan Arab Jamahiriya, Portugal and Turkey, as well as from the Permanent Observer for the Holy See, to attend the session. Following past practice, those delegations were invited to attend the current session of the Subcommittee and to address it as appropriate. This was without prejudice to further requests of that nature and did not involve any decision of the Subcommittee concerning status, but was a courtesy that the Subcommittee extended to those delegations.

12. General statements were made by the following delegations: Argentina, Austria, Brazil, Canada, Chile, China, France, Germany, Hungary, India, Indonesia, Morocco, Nigeria, Pakistan, Poland, Russian Federation, Sweden, United Kingdom and Uruguay. General statements were also made by the representatives of FAO, WMO, UNESCO, COSPAR, IAF, ISPRS and INTELSAT.

13. At the 417th meeting, the Chief of the Office for Outer Space Affairs made a statement reviewing the work programme of the Office. At the 421st meeting, the Expert on Space Applications made a statement outlining the activities carried out and planned under the United Nations Programme on Space Applications.

Technical presentations

14. In accordance with paragraph 8 (b) (vii) of General Assembly resolution 47/67 of 14 December 1992, a symposium on the theme "Space-based communication: the expansion of current services and increased understanding

of new systems and the services they will make possible" was organized by COSPAR and IAF to complement discussions within the Subcommittee on the special theme. The symposium was co-chaired by Mr. George Ohring, Chairman of the COSPAR Commission on Space Studies of the Earth's Surface, Meteorology and Climate, and Mr. Dale Fester, Vice President, IAF. The presentations included: "The Changing Environment for Global Communications" by Mr. Richard C. Kirby, Director, International Radio Consultative Committee, ITU; "The Changing Dynamics at INTELSAT" by Mr. D. K. Sachdev, Director, Communications Engineering and System Planning, INTELSAT; "The Changing Dynamics at INMARSAT" by Mr. Jai Singh, General Manager, Project 21, INMARSAT; "The Movement to Global Personal Communications Services" by Mr. Peter Swan, Manager, Systems Engineering, Motorola; "Disaster Mitigation: The Critical Communication Link" by Mr. Ray J. Arnold, Acting Director for Commercial Innovation and Competitiveness, Office of Advanced Concepts and Technology, National Aeronautics and Space Administration (NASA), United States; "Telemedicine for the Globe: The West African Case Study" by astronaut Mae C. Jemison, NASA; "Satellite Communications for Development" by Mr. Oetarjo Diran, Deputy Chairman, National Institute of Aeronautics and Space (LAPAN), Indonesia; and "Satellite Communications in China" by Prof. Yiyuan Chen, Chief Engineer, Institute of Space Technology, Ministry of Aeronautics and Space, China.

15. In response to General Assembly resolution 47/67, Mr. Hugues Laporte-Weywada of the Directorate of Launchers, Centre National d'Etudes Spatiales, France, made a special presentation on the complex issue of space debris and the solutions currently being adopted at the national level, taking into account the work performed within the ad hoc working group of experts of IAF on the issue.

16. During the course of the session, scientific and technical presentations were made by Astronaut Mae C. Jemison, NASA, on human space flight; by Mr. V. V. Alaverdov, First Deputy Head, Russian Space Agency, on the activities of the Russian Space Agency; by Dr. Janis Stoklosa, Manager, Space Human Factors Program, NASA, on "Putting Humans in Space, Helping People on Earth"; by Mr. Noah Samara, Chief Executive, Afrispace, on "Radio Broadcasting Services for Africa: Emerging Developments"; and by Dr. Marianne von Glehn, Swedish Space Board, on "The Swedish Scientific Space Programme and Small Scientific Satellites".

Recommendations of the Scientific and Technical Subcommittee

17. After considering the various items before it, the Subcommittee, at its 430th meeting, on 25 February 1993, adopted its report to the Committee on the Peaceful Uses of Outer Space containing its views and recommendations as set out in the paragraphs below.

I. UNITED NATIONS PROGRAMME ON SPACE APPLICATIONS AND THE COORDINATION OF SPACE ACTIVITIES WITHIN THE UNITED NATIONS SYSTEM

II. IMPLEMENTATION OF THE RECOMMENDATIONS OF THE SECOND UNITED NATIONS CONFERENCE ON THE EXPLORATION AND PEACEFUL USES OF OUTER SPACE

18. In accordance with General Assembly resolution 47/67, the Subcommittee continued its consideration of these items. In accordance with past practice, the Subcommittee considered the two items jointly.

19. The Subcommittee noted that the General Assembly, in paragraph 14 of resolution 47/67, had once again emphasized the urgency and importance of implementing fully the recommendations of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE 82) as early as possible. The Subcommittee also took note of paragraph 9 of the same resolution, in which the General Assembly considered that, in the context of the Subcommittee's consideration of the item, it was particularly urgent to implement the following recommendations:

"(a) All countries should have the opportunity to use the techniques resulting from medical studies in space;

"(b) Data banks at the national and regional levels should be strengthened and expanded and an international space information service should be established to function as a centre of coordination;

"(c) The United Nations should support the creation of adequate training centres at the regional level, linked, whenever possible, to institutions implementing space programmes; necessary funding for the development of such centres should be made available through financial institutions;

"(d) The United Nations should organize a fellowship programme through which selected graduates or postgraduates from developing countries should get in-depth, long-term exposure to space technology or applications; it is also desirable to encourage the availability of opportunities for such exposure on other bilateral and multilateral bases outside the United Nations system."

20. In response to the recommendations of the Working Group of the Whole to Evaluate the Implementation of the Recommendations of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space, as contained in its report on the work of its sixth session, held in 1992 (A/AC.105/513, annex II, paras. 6-20), which were endorsed by the General Assembly in paragraph 11 of resolution 47/67, the Subcommittee had before it the following documents: a report on international cooperation in the peaceful uses of outer space: activities of Member States (A/AC.105/523), containing information submitted by Member States in response to paragraph 10 of the report of the Working Group; a review of the applications of space

technology on remote and rural communications (A/AC.105/536), in response to paragraph 17 (ii); a study on applications of space technology to ocean resource development (A/AC.105/535), in response to paragraph 17 (iv). In addition, the Subcommittee had before it annual reports, including information in response to paragraph 11, submitted by the following international organizations: WMO (A/AC.105/537 and A/AC.105/538); ESA (A/AC.105/539); INTELSAT (A/AC.105/540); International Maritime Satellite Organization (INMARSAT) (A/AC.105/541); and ITU.

21. In accordance with paragraph 10 of General Assembly resolution 47/67, the Subcommittee reconvened the Working Group of the Whole with a view to improving the execution of activities relating to international cooperation, particularly those included in the United Nations Programme on Space Applications, and to proposing concrete steps to increase such cooperation as well as to make it more efficient. The Working Group was chaired by Mr. Muhammad Nasim Shah (Pakistan); it held 3 meetings between 18 and 25 February 1993 and adopted its report on 25 February 1993.

22. Having considered the report of the Working Group of the Whole, the Subcommittee decided at its 430th meeting, on 25 February 1993, to adopt that report, as contained in annex II to the present report, on the understanding that the recommendations contained therein would be carried out in accordance with paragraph 9 of General Assembly resolution 37/90 of 10 December 1982. The Subcommittee recommended that the Working Group be reconvened next year to continue its work.

A. United Nations Programme on Space Applications

23. Regarding the expanded United Nations Programme on Space Applications, the Subcommittee had before it the report of the United Nations Expert on Space Applications (A/AC.105/533). The report was supplemented by the statement by the Expert. The Subcommittee noted that the Programme on Space Applications for 1992 had been carried out satisfactorily and commended the work accomplished by the Expert in carrying out the work programme as endorsed by the Subcommittee at its last session.

24. The Subcommittee noted with appreciation that since its last session additional contributions had been offered by various Member States and organizations and that they had been acknowledged with appreciation in paragraph 54 of the Expert's report.

25. The Subcommittee continued to express its concern over the limited financial resources available for carrying out the Programme and appealed to Member States to support the Programme through voluntary contributions. The Subcommittee felt that the limited resources of the United Nations should be focused on the highest priority activities and noted that the Programme on Space Applications was the priority activity of the Office for Outer Space Affairs.

26. The Subcommittee noted that, in response to the report of the Subcommittee at its last session, the Committee on the Peaceful Uses of Outer Space had requested the General Assembly to make an adequate allocation for the Programme on Space Applications in order to fully implement the recommendations of UNISPACE 82. The Subcommittee noted that the Special Political Committee of the General Assembly, in considering the report of the Committee on the Peaceful Uses of Outer Space, had decided to accede to that request and that the Chairman of the Special Political Committee had conveyed that decision in a letter to the Chairman of the Fifth Committee of the General Assembly (A/C.5/47/51). On the recommendation of the Fifth Committee, the General Assembly, in resolution 47/219 of 23 December 1992, took note of the letter from the Chairman of the Special Political Committee. The Subcommittee expressed its hope that those recommendations and actions would be reflected in an adequate allocation for the Programme on Space Applications in the 1994-1995 budget.

1. 1992-1993

(a) United Nations training courses, workshops, conferences and symposia

27. With regard to the activities of the programme carried out in 1992, the Subcommittee expressed its appreciation to:

(a) The Governments of Ecuador and Japan for co-sponsoring the United Nations Workshop on Space Technology for Resource Development and Environmental Management hosted by the Centro de Levantamientos Integrados de Recursos Naturales por Sensores Remotos (CLIRSEN) in Quito from 9 to 13 March 1992;

(b) The Government of Sweden, represented by the Swedish Agency for International Technical and Economic Cooperation (BITS), for co-sponsoring the second United Nations Training Course in Remote Sensing Education for Educators hosted by Stockholm University and the Swedish Space Corporation Satellitbild and held in Stockholm and Kiruna from 11 May to 1 June 1992;

(c) The Government of the United States, represented by NASA, the National Oceanic and Atmospheric Administration (NOAA), the United States Geological Survey and the Consortium for International Earth Science Information Network, for co-sponsoring the United Nations/United States International Conference on Satellite Remote Sensing for Resource Management, Environmental Assessment and Global Change Studies: Needs and Applications of Developing Countries held in Boulder, Colorado, from 17 to 20 August 1992;

(d) The Government of Germany as well as the Carl Duisberg Gesellschaft for co-sponsoring the fourth United Nations International Training Course on Remote Sensing Applications to Geological Science hosted by the GeoResearch Centre, Potsdam, and the Free University of Berlin from 28 September to 16 October 1992;

(e) ESA for co-sponsoring the Regional Training Course on the use of Remote Sensing Systems in Hydrological and Agrometeorological Applications hosted by the Regional Centre for Services in Surveying, Mapping and Remote Sensing (RCSSMRS), Nairobi, from 12 to 30 October 1992;

(f) The Governments of Costa Rica and Colombia as well as ESA and the Planetary Society for co-sponsoring the second United Nations/ESA/Planetary Society Workshop on Basic Space Science hosted by the University of Costa Rica, San José, and the International Centre for Physics (CIF) and the University of the Andes, Santa Fe de Bogotá, and held from 2 to 7 November 1992 in San José and from 9 to 13 November 1992 in Santa Fe de Bogotá;

(g) The Government of the Republic of Korea for co-sponsoring and hosting the United Nations Workshop on Space Communications for Development, held in Seoul from 24 to 28 November 1992.

28. The Subcommittee took note of the status of the United Nations workshops, training courses and conferences being held in 1993, which included the following activities, as described in paragraph 42 of the Expert's report:

(a) A United Nations/ESA Training Course for African Francophone Countries on Applications of the European Remote Sensing Satellite (ERS-1) for Natural Resources, Renewable Energy and Environment to be organized in cooperation with the Department of Economic and Social Development and held at the European Space Research Institute (ESRIN) in Frascati, Italy, from 19 to 30 April 1993;

(b) The Third United Nations/Sweden Training Course on Remote Sensing Education for Educators, to be organized in cooperation with the Government of Sweden and held in Stockholm and Kiruna from 3 May to 4 June 1993;

(c) A United Nations Workshop on Space Communications for Development for the benefit of Member States of the Mediterranean and adjacent areas, to be organized in cooperation with the Government of Greece and held in Athens from 10 to 12 May 1993;

(d) A United Nations Regional Conference on Space Science Technology for Sustainable Development for the benefit of countries of the region of the Economic and Social Commission for Asia and the Pacific (ESCAP), to be organized in cooperation with the Government of Indonesia and held in Bandung, from 17 to 21 May 1993;

(e) A United Nations/Office of the United Nations Disaster Relief Coordinator (UNDRO)/ESA Workshop on Applications of Space Technology to combat Natural Disasters, for the benefit of Member States in the region of the Economic Commission for Latin America and the Caribbean (ECLAC), to be organized in cooperation with the Government of Mexico in September 1993;

(f) A United Nations Regional Conference on Africa's Environmental and Natural Resources Information and Management Needs, to be organized in cooperation with the Government of Senegal in October 1993;

(g) A United Nations/IAF/ESA Symposium on Organizing Space Activities in Developing Countries: Resources and Mechanisms, to be organized in cooperation with the Government of Austria and IAF and held in Graz from 15 to 17 October 1993;

(h) A United Nations Workshop on the Use of Space Techniques for Monitoring and Control of Desert Environments, to be organized for the benefit of Member States in the region of the Economic and Social Commission for West Asia (ESCWA) and held in November 1993;

(i) A United Nations Workshop on Basic Space Science, to be organized for the benefit of Member States in Africa in November 1993;

(j) The Fifth United Nations Training Course on Remote Sensing Applications to Geological Sciences, to be organized in cooperation with the Government of Germany and the Carl Duisberg Gesellschaft and held in Nepal in late 1993.

(b) Long-term fellowships for in-depth training

29. The Subcommittee expressed appreciation to the Governments of Brazil and China as well as to ESA for having offered training fellowships in various areas relating to space activities for the period 1991-1992. The Subcommittee once again expressed appreciation to those Governments and agencies for the renewal of fellowships for the period 1992-1993. The Status of the 1992-1993 fellowships and the countries whose candidates have received fellowships are indicated in annex II to the Expert's report (A/AC.105/533).

30. The Subcommittee noted that it was important to increase the opportunities for in-depth education in all areas of space science, technology and applications projects through long-term fellowships.

(c) Technical advisory services

31. The Subcommittee took note of the technical advisory services being provided by the Office for Outer Space Affairs in support of regional space applications projects, as indicated in the report of the Expert:

(a) Collaboration with ESA on a survey and selection of projects to receive remote sensing data made available by ESA to African countries covered by ESA's two remote sensing ground receiving stations at Maspalomas, Spain, and Fucino, Italy;

(b) Assistance to the Government of Ecuador in promoting regional operation, administration and funding of the remote sensing receiving station at Cotopaxi, Ecuador;

(c) Assistance to the Government of Chile in the preparation of the Second Space Conference of the Americas;

(d) Cooperation with the Government of Nigeria in a seminar on space science and technology;

(e) Cooperation with the Government of the Islamic Republic of Iran in a seminar on remote sensing of the environment and space applications;

(f) Assistance to the Government of the Republic of Korea in the establishment of the Asia-Pacific Satellite Communications Conference;

(g) Cooperation with the Indian Ocean Marine Affairs Cooperation (IOMAC) programme in the development of remote sensing projects for coastal zone management and monitoring;

(h) Cooperation in the Asia-Pacific Workshop on Multilateral Cooperation in Space Technology and Applications.

(d) Promotion of greater cooperation in space science and technology

32. The Subcommittee noted that the United Nations was collaborating with international professional bodies in the space community to promote exchange of experience on space activities. In 1992, the Programme on Space Applications co-sponsored the following activities:

(a) The United Nations and ISPRS collaborated in a joint United Nations/ISPRS Workshop on Remote Sensing Data Analysis Methods and Applications, held in Washington, D.C., on 6 and 7 August 1992 during the ISPRS Congress for the benefit of scientists from developing countries;

(b) The United Nations co-sponsored a United Nations/IAF/COSPAR/American Institute of Aeronautics and Astronautics (AIAA) Symposium on Space Technology in Developing Countries - Making it Happen, held in Washington, D.C. from 28 to 30 August 1992 in conjunction with the COSPAR/IAF World Space Congress.

2. 1994

(a) United Nations training courses, workshops and symposia

33. The Subcommittee recommended the approval of the following programme of training courses, workshops and symposia proposed for 1994:

(a) A United Nations International Workshop on Spin-off Benefits of Space Technology;

(b) The Fourth United Nations/Sweden International Training Course on Remote Sensing Education for Educators, to be held in Stockholm and Kiruna, Sweden;

(c) A United Nations International Training Course on Communications Technology for Development;

(d) A United Nations Microwave Remote Sensing Workshop to be organized in cooperation with ESCAP and the Government of China and held at Beijing in April/May 1994;

(e) A United Nations/UNDRO Regional Workshop on Space Technology to Combat Natural Disasters for the benefit of Member States in the ECA region;

(f) A United Nations Regional Training Course on Remote Sensing Applications for the benefit of ECLAC Member States;

(g) A United Nations Workshop on Basic Space Science in Development Programmes for the benefit of ESCAP and ESCWA Member States;

(h) A United Nations International Workshop on the Development and Design of Small Experimental Payloads; and

(i) A United Nations/IAF Symposium on Space Technology in Developing Countries.

B. International space information service

34. The Subcommittee noted with satisfaction that the Office for Outer Space Affairs was in the process of developing an international space information system, including both information within the United Nations system and access to external databases.

35. The Subcommittee noted with satisfaction the publication of documents entitled "Seminars of the United Nations Programme on Space Applications: Selected Papers on Remote Sensing, Satellite Communications and Space Science" (A/AC.105/532); "Directory of Information Systems on Space Science Technology" (A/AC.105/517); "Space Activities of the United Nations and International Organizations" (A/AC.105/521); and "Planetarium: A Challenge for Educators". It also noted that the Secretariat was preparing an updated edition of the Directory on Education, Training, Research, and Fellowship Opportunities in Space Science and Technology and its Applications (A/AC.105/432).

C. Reports

36. The Subcommittee took note with appreciation of the reports submitted to it by Member States and international organizations in response to the recommendations of the Working Group of the Whole in its report on the work of its sixth session (A/AC.105/513, annex II, paras. 6-20). It also noted the technical studies prepared by the Secretariat on space applications for ocean resource development (A/AC.105/535) and on applications of space technology for remote and rural communications and broadcasting (A/AC.105/536).

D. Coordination of space activities within the United Nations system and inter-agency cooperation

37. The Subcommittee noted that the General Assembly, in resolution 47/67, had reaffirmed its request that all organs, organizations and bodies of the United Nations system and other intergovernmental organizations working in the field of outer space or on space-related matters should cooperate in the implementation of the recommendations of UNISPACE 82.

38. The Subcommittee noted with satisfaction that the Inter-Agency Meeting on Outer Space Activities had been convened by the Administrative Committee on Coordination (ACC) at UNESCO headquarters in Paris, from 5 to 7 October 1992 and that its report (ACC/1992/28) was before the Subcommittee. The Subcommittee took note of the information provided on the progress achieved in coordinating the space activities of the organizations of the United Nations system and expressed its appreciation for the report of the Secretary-General entitled "Coordination of outer space activities within the United Nations system: programmes of work for 1993 and 1994 and future years" (A/AC.105/524).

39. The Subcommittee continued to stress the necessity of ensuring continuous and effective consultations and coordination in the field of outer space activities among organizations within the United Nations system and the avoidance of duplication of activities.

E. Regional and interregional cooperation

40. The Subcommittee noted that the General Assembly, in its resolution 47/67, had reaffirmed its approval of the recommendations of UNISPACE 82 regarding the establishment and strengthening of regional mechanisms of cooperation and their promotion and creation through the United Nations system. The Subcommittee noted with satisfaction that, in carrying out various activities in the implementation of the recommendations of UNISPACE 82, the Secretariat had sought to strengthen those mechanisms.

41. The Subcommittee noted with appreciation the efforts undertaken as part of the United Nations Programme on Space Applications, in accordance with the UNISPACE 82 recommendation concerning the development of indigenous capabilities, to establish regional centres for space science and technology education in existing national or regional educational institutions in developing countries, as outlined in the report entitled "Centres for Space Science and Technology Education: Updated Project Document" (A/AC.105/534).

42. The Subcommittee noted with appreciation the offers by a number of Member States to host such regional centres and indications of support from other Member States. The Subcommittee noted that an evaluation mission concerning the establishment of such a regional centre had been undertaken to a number of potential host countries and institutions in Latin America, and that representatives from potential supporting Governments had participated in that mission. The Subcommittee noted that similar evaluation missions were being

planned for other regions. The Subcommittee urged other Member States to support the establishment of the centres and requested the Office for Outer Space Affairs to make every possible effort to obtain the support of other relevant international organizations. The Subcommittee requested that it be kept informed of further developments on the subject.

43. The Subcommittee noted that the Second Space Conference of the Americas was being hosted by the Government of Chile in Santiago from 26 to 30 April 1993 and would promote cooperation in space activities primarily for the benefit of countries in the Latin American and Caribbean region. The Subcommittee also noted that the Regional Conference on Space Science and Technology for Sustainable Development, to be held in Indonesia in May 1993, and the Regional Conference on Africa's Environmental and Natural Resources Information and Management Needs, to be held in Senegal in October 1993, would promote regional cooperation for the benefit of countries in those regions.

44. The Subcommittee noted the contributions made by specialized agencies and other international organizations towards the promotion of international cooperation in space activities: FAO was continuing its activities relating to remote sensing of renewable natural resources and environmental monitoring, including training courses and support of development projects; ITU was continuing its work in the international coordination of space communications, including providing technical assistance to developing countries; WMO was continuing international cooperative programmes using space technology, including the World Weather Watch and the Tropical Cyclone Programme; UNESCO was promoting applications to space technology for archaeology and strengthening international and interdisciplinary cooperation between archaeological projects; INMARSAT was continuing to develop its satellite communication system for maritime, aeronautical and land-mobile communications, including the development of small, low-cost terminals and the provision of technical assistance and training; INTELSAT was further developing its system for international satellite communications and broadcasting, including its programmes for training and technical assistance; ESA was continuing its programme of international cooperative space activities, including training programmes for the benefit of developing countries, support of the activities of the United Nations Programme on Space Applications and technical assistance projects.

45. The Subcommittee emphasized the importance of regional and international cooperation in making the benefits of space technology available to all countries, through such cooperative activities as shared payloads, dissemination of information on spin-off benefits, ensuring compatibility of space systems and providing access to launch capabilities at reasonable cost.

III. MATTERS RELATING TO REMOTE SENSING OF THE EARTH BY SATELLITES INCLUDING, INTER ALIA, APPLICATIONS FOR DEVELOPING COUNTRIES

46. In accordance with General Assembly resolution 47/67, the Subcommittee continued its consideration of this item.

47. In the course of the debate, delegations reviewed the national and cooperative programmes in remote sensing. Examples were given of national programmes in developing and developed countries and of international programmes based on bilateral, regional and international cooperation, including programmes of technical cooperation between developing countries. Countries with advanced capabilities in the field, including some developing countries, described programmes to provide assistance to other developing countries.

48. The Subcommittee took note of the continuing programmes of China, France, India, Japan, the Russian Federation, the United States and ESA for remote-sensing satellites as well as the planned remote-sensing satellite systems of Brazil and Canada. The Subcommittee noted that the recent launches of the European Remote Sensing (ERS-1) satellite and the Japanese Earth Resources Satellite (JERS-1) would provide valuable microwave data to complement the multispectral data from satellites of the Landsat, Resurs, SPOT, Indian Remote Sensing (IRS) and Marine Observation Satellite (MOS) series. It also took note of the activities of FAO in remote sensing of renewable natural resources, including land-cover mapping and geographic information systems, of the initiative of UNESCO for the establishment of satellite data centres, of the work of WMO in the areas of weather forecasting and storm warning and of ISPRS in promoting international cooperation in remote sensing and image processing.

49. The Subcommittee reiterated its view that remote-sensing activities should take into account the need to provide appropriate and non-discriminatory assistance to meet the needs of the developing countries.

50. The Subcommittee emphasized the importance of making remote-sensing data and analysed information openly available to all countries at reasonable cost and in a timely manner. The Subcommittee also recognized the need for continuing free access to data from operational meteorological satellites.

51. The Subcommittee considered that international cooperation in the use of remote-sensing satellites should be encouraged, both through coordination of the operations of ground stations and through regular meetings between satellite operators and users. It noted the importance of compatibility and complementarity of existing and future remote-sensing systems. The Subcommittee also noted the importance, particularly for the developing countries, of sharing experiences and technologies, of cooperation through international and regional remote-sensing centres and of joint work on collaborative projects.

52. Recalling General Assembly resolution 41/65 of 3 December 1986, by which the Assembly had adopted the Principles Relating to Remote Sensing of the Earth from Outer Space, the Subcommittee recommended that at its thirty-first session it continue its discussion on remote-sensing activities conducted in accordance with those Principles, during its consideration of the agenda item concerning remote sensing.

53. The Subcommittee recommended that the item be retained on its agenda as a priority item for the next session.

IV. USE OF NUCLEAR POWER SOURCES IN OUTER SPACE

54. In accordance with General Assembly resolution 47/67, the Subcommittee continued its consideration of this item.

55. The Subcommittee noted with satisfaction that, on the basis of many years of work in the Committee and its subcommittees, the General Assembly had adopted a Set of Principles Relevant to the Use of Nuclear Power Sources in Outer Space, as contained in resolution 47/68 of 14 December 1992. The Subcommittee also noted that the Principles provided that they should be reopened for revision by the Committee on the Peaceful Uses of Outer Space no later than two years after their adoption.

56. In accordance with General Assembly resolution 47/67, the Working Group on the Use of Nuclear Power Sources in Outer Space was reconvened to resume its work at the current session. The Working Group met from 22 to 25 February under the chairmanship of Professor J. H. Carver (Australia). At a meeting held on 25 February 1993, the Working Group adopted its report.

57. At its 430th meeting, on 25 February 1993, the Subcommittee adopted the report of the Working Group, which is contained in annex III to the present report.

58. The Subcommittee noted that in response to its recommendation, the General Assembly, in resolution 47/67, had invited Member States to report to the Secretary-General on a regular basis with regard to national and international research concerning the safety of nuclear-powered satellites. The Subcommittee also noted that the General Assembly, in the same resolution, had considered that, to the extent possible, information on the problem of collisions of space objects, including nuclear power sources, with space debris should be provided to the Scientific and Technical Subcommittee in order to allow it to follow this area more closely. The Subcommittee noted that information had been submitted in response to those requests, as contained in document A/AC.105/542 and Add.1 and 2, by Austria, Germany, Pakistan, Sweden and the United Kingdom.

59. The Subcommittee agreed that Member States should continue to be invited to report to the Secretary-General on a regular basis with regard to national and international research concerning the safety of nuclear-powered

satellites. The Subcommittee also agreed that further studies should be conducted on the problem of the collision of nuclear power sources with space debris and that it should be kept informed of the results of such studies.

60. The Subcommittee took note of working papers submitted by the United Kingdom (A/AC.105/C.1/L.187) and the Russian Federation (A/AC.105/C.1/L.188) on safety aspects of nuclear power sources in space, and a paper circulated by Pakistan (S&T/1993/CRP.2) on risks and radiological consequences of debris collisions with nuclear power sources in space.

61. The Subcommittee recommended that the item be retained on its agenda for the next session. The Subcommittee also recommended that the Working Group on the Use of Nuclear Power Sources in Outer Space be reconvened at its next session.

V. QUESTIONS RELATING TO SPACE TRANSPORTATION SYSTEMS AND THEIR IMPLICATIONS FOR FUTURE ACTIVITIES IN SPACE

62. In accordance with General Assembly resolution 47/67, the Subcommittee continued its consideration of this item.

63. In the course of the discussion, delegations reviewed national and international cooperative programmes in space transportation systems, including expendable launchers, reusable space shuttles and space stations. In particular, the Committee noted that China was continuing the use and development of its Long March series of launch vehicles; that India was continuing development of the Augmented Satellite Launch Vehicle, the Polar Satellite Launch Vehicle and the Geostationary Satellite Launch Vehicle; that Japan was continuing its development of the H-II and M-5 launch vehicles; that the Russian Federation had launched 78 space objects of various types using expendable launchers of the Soyuz, Cosmos, Proton, Tsyklon and other series, and had sent a number of national and international crews to the Mir space station; that the United Kingdom was cooperating with the Russian Federation and Ukraine on the concept of the reusable interim HOTOL system; that the United States was continuing its programme of expendable launches and flights of the reusable Space Shuttle and was developing the Space Station Freedom in cooperation with Canada, Japan and ESA; and that ESA was continuing development of the Ariane series of launch vehicles. The Subcommittee heard a special presentation by a United States astronaut on a Space Shuttle/Spacelab mission that conducted microgravity experiments, as mentioned in paragraph 16 of the present report.

64. The Subcommittee took note of developments in low-cost microsatellite technology and applications that could allow more countries to take an active part in space activities.

65. The Subcommittee stressed the importance of international cooperation in space transportation in order to provide all countries with access to the benefits of space science and technology.

66. The Subcommittee recommended that consideration of the item be continued at its next session.

VI. EXAMINATION OF THE PHYSICAL NATURE AND TECHNICAL ATTRIBUTES OF THE GEOSTATIONARY ORBIT; EXAMINATION OF ITS UTILIZATION AND APPLICATIONS, INCLUDING, INTER ALIA, IN THE FIELD OF SPACE COMMUNICATIONS, AS WELL AS OTHER QUESTIONS RELATING TO SPACE COMMUNICATIONS DEVELOPMENTS, TAKING PARTICULAR ACCOUNT OF THE NEEDS AND INTERESTS OF DEVELOPING COUNTRIES

VII. THE THEME FIXED FOR SPECIAL ATTENTION AT THE 1993 SESSION: "SPACE-BASED COMMUNICATION: THE EXPANSION OF CURRENT SERVICES AND INCREASED UNDERSTANDING OF NEW SYSTEMS AND THE SERVICES THEY WILL MAKE POSSIBLE"

67. In accordance with General Assembly resolution 47/67, the Subcommittee continued its consideration of the item relating to the geostationary orbit and space communications and considered the special theme.

68. In accordance with General Assembly resolution 47/67, the Subcommittee paid special attention to the theme "Space-based communication: the expansion of current services and increased understanding of new systems and the services they will make possible". The Subcommittee noted with satisfaction that, at its invitation, COSPAR and IAF had organized a symposium on the theme on 16 and 17 February 1993 (see para. 14 above). The Subcommittee expressed appreciation to COSPAR and IAF for the very instructive symposium.

69. In the course of the discussion, delegations reviewed national and international cooperative programmes in satellite communications, including progress in communication satellite technology that would make satellite communications more accessible and less expensive and increase the communications capacity of the geostationary orbit and the electromagnetic spectrum.

70. The Subcommittee took note of the growing use of communication satellite systems for telecommunications, television broadcasting, data networks, environmental data relay, mobile communications, disaster warning and relief, telemedicine and other communication functions. The Subcommittee also took note of studies and research on the use of multiple, low-orbiting satellites for mobile and other communication services.

71. Some delegations expressed the view that the geostationary orbit was a limited natural resource and that saturation should be avoided in order to ensure that all countries had non-discriminatory access to the orbit. Those delegations felt that a special regime was required to ensure equitable access by all States, particularly developing countries. They felt that the roles of ITU and the Committee on the Peaceful Uses of Outer Space with respect to the geostationary orbit were complementary. Other delegations expressed the view that questions relating to the geostationary orbit were being addressed effectively in ITU.

72. Some delegations expressed the view that in considering the question of equitable access, account should be taken in particular of the characteristics of the equatorial countries.

73. Some delegations noted that the use of the geostationary orbit, like other orbits, was affected by the problem of space debris and that efforts were needed to minimize the generation of debris in the orbit and to move satellites shortly before the end of their useful lives into disposal orbits beyond the geostationary orbit.

74. The Subcommittee noted the use of the Cospas/Sarsat search-and-rescue satellite system developed and operated on the basis of international cooperation. The Subcommittee recommended that countries not already participating in that programme consider doing so.

75. The Subcommittee recommended that consideration of the item relating to the geostationary orbit and space communications be continued at its next session.

VIII. PROGRESS IN NATIONAL AND INTERNATIONAL SPACE ACTIVITIES RELATED TO THE EARTH ENVIRONMENT, IN PARTICULAR PROGRESS IN THE GEOSPHERE-BIOSPHERE (GLOBAL CHANGE) PROGRAMME

76. In accordance with General Assembly resolution 47/67, the Subcommittee continued its consideration of the item concerning progress in national and international space activities related to the Earth environment, in particular progress in the International Geosphere-Biosphere (Global Change) Programme.

77. The Subcommittee noted that the Secretariat, at the request of the Committee and the General Assembly, was preparing an analytical study on the role that the Committee could play in view of the decisions and recommendations of the United Nations Conference on Environment and Development, held at Rio de Janeiro in June 1992. The Subcommittee noted that the General Assembly had invited Member States to submit their views on the subject in time for inclusion in that study and urged Member States to respond to that request.

78. The Subcommittee noted the progress being made through international cooperation in the International Geosphere-Biosphere Programme, with the participation of many countries. It noted that such a joint international effort was of fundamental importance for examining the future habitability of the planet and for managing the common natural resources of the Earth. The Subcommittee took particular note of the need to involve as many nations as possible in the scientific activities of the Programme, both in developed and in developing countries.

79. The Subcommittee took note of the important contributions of satellite remote sensing for environmental monitoring, for planning sustainable development, for water resource development, for monitoring crop conditions and for predicting and assessing drought.

80. The Subcommittee noted the important contribution of meteorological and atmospheric research satellites for studying global climate change, the greenhouse effect, the degradation of the ozone layer and other global environmental processes. The recent launches of the Topex/Poseidon oceanographic satellite, the Upper Atmosphere Research Satellite and the Total Ozone Mapping System have provided important new tools for this purpose. The Subcommittee noted the need for further space research relating to climate change, weather patterns, vegetation distribution, storm and flood risk and other environmental factors.

81. The Subcommittee noted the importance of international cooperation in the various existing and planned satellite systems for environmental monitoring. It recommended that other States consider participating in such cooperative activities.

82. The Subcommittee recommended that consideration of the item be continued at its next session.

IX. MATTERS RELATING TO LIFE SCIENCES, INCLUDING SPACE MEDICINE

83. In accordance with General Assembly resolution 47/67, the Subcommittee continued its consideration of this item. The Subcommittee heard a special presentation on the question by an expert from the United States, as mentioned in paragraph 16 of the present report.

84. The Subcommittee recalled that the General Assembly, in resolution 47/67, had considered it particularly important that all countries should have the opportunity to use the techniques resulting from medical studies in space.

85. The Subcommittee noted that studies of human and animal physiology under the microgravity conditions of space flight had led to important advances in medical knowledge in such areas as blood circulation, sensory perception, immunology and the effects of cosmic radiation. It noted that important new information in these fields had been obtained through experiments on the Mir space station, the United States Space Shuttle, the United States/ESA Spacelab, the European Recoverable Carrier (Eureca), biological satellites and sounding rockets.

86. The Subcommittee noted that applications of space technologies were demonstrating growing promise in medicine and public health on Earth. Satellite communications for telemedicine were providing expert medical advice to distant areas, as illustrated by the Telemedicine Spacebridge linking medical centres in the United States and the Russian Federation. The Subcommittee also noted that products of space biotechnology, such as pharmaceuticals and medical instruments, could contribute to improved health care. The Subcommittee noted the importance of space technology for these purposes and encouraged further research and exchange of information on those applications.

87. The Subcommittee noted that space studies in life sciences and medicine had important potential benefits for all countries and that efforts should be made to promote international cooperation to enable all countries to benefit from those advances.

88. The Subcommittee recommended that consideration of the item be continued at its next session.

X. MATTERS RELATING TO PLANETARY EXPLORATION

XI. MATTERS RELATING TO ASTRONOMY

89. In accordance with General Assembly resolution 47/67, the Subcommittee continued its consideration of these items.

90. The Subcommittee noted that several planetary exploration missions were currently under way. The Magellan spacecraft was completing its systematic radar mapping programme of Venus. The Galileo spacecraft was on its way to Jupiter, having passed around Venus and the Earth and made close observations of the asteroid Gaspra. The Ulysses spacecraft, following its swing-by manoeuvre of Jupiter, was moving away from the plane of the solar system on its way to observe the polar regions of the Sun. The Mars Observer was en route to make close observations of Mars. The Giotto spacecraft had been reactivated to make observations of the comet Grigg-Skjellerup. The Subcommittee also noted the plans for future spacecraft to conduct comprehensive investigations of Mars and Saturn and its moons. The Subcommittee noted the high degree of international cooperation in all of those investigations and stressed the need to further enhance international cooperation in planetary exploration to enable all countries to benefit from and participate in those activities.

91. The Subcommittee noted that the use of spacecraft for making astronomical observations from above the atmosphere had greatly advanced knowledge of the universe by allowing observations in all regions of the electromagnetic spectrum. It noted that with the Hubble Space Telescope, the Rosat, Granat and Roentgen-Kvant X-ray observatories, the Compton Gamma Ray Observatory, the Hipparcos spacecraft, the Extreme Ultraviolet Explorer, and the Astro-D, Freya and Sampex satellites, and with data from the recent Stretched Rohini Scientific Satellite (SROSS-C), astronomers had powerful tools for their investigations of the universe. The planned launches of the Radioastron satellite, the Spektr-Roentgen-Gamma observatory, the Infrared Space Observatory, the Advanced X-ray Astrophysics Facility, the Space Infrared Telescope Facility, the Wind Spacecraft, Spektr-UV, Relict-2 and the Scientific Applications Satellite (SAC-B) would open up further realms of the universe to detailed observation. The Subcommittee noted with satisfaction that all of those projects were open to broad international cooperation.

92. The Subcommittee recommended that consideration of the items be continued at its next session.

XII. OTHER MATTERS

A. International Space Year - 1992

93. The Subcommittee noted the activities undertaken by the United Nations for International Space Year (ISY) as described in A/AC.105/445/Add.9, including training courses, workshops, conferences, symposia, technical advisory services and publications.

94. Noting that the participation of the United Nations in ISY had been funded by voluntary contributions, the Subcommittee expressed its appreciation to the Member States and international organizations that had made voluntary contributions for the purpose.

95. The Subcommittee noted the wide variety of national and international programmes that had been undertaken as part of ISY, including the activities being coordinated through the Space Agency Forum on International Space Year (SAFISY), COSPAR, IAF and ISPRS. It noted in particular the World Space Congress organized jointly by COSPAR and IAF, including activities organized in cooperation with the United Nations. The Subcommittee also noted that a number of major regional meetings had been organized in the context of ISY, including the European ISY Conference at Munich, Germany, the ISY Conference for Africa, "MARISY-92: Evaluation of Natural Resources with Remote Sensing Techniques", at Rabat, Morocco, the Asia-Pacific ISY Conference at Tokyo and the Asia-Pacific Workshop on Multilateral Cooperation in Space Technology and Applications at Beijing.

96. The Subcommittee noted that the international programmes initiated during ISY had made important contributions to international cooperation in space activities, particularly in the use of space technology for studying and monitoring the environment. The Subcommittee recognized the importance of continuing those cooperative activities and urged the cooperating countries to encourage other countries to participate.

97. The Subcommittee requested the Secretariat to continue to promote international cooperation in the activities initiated during ISY and to keep it informed of further developments in that area.

B. Third UNISPACE Conference

98. The Subcommittee endorsed the recommendation of the Working Group of the Whole concerning the possibility of holding a third UNISPACE Conference, as contained in paragraph 20 of the report of the Working Group.

C. Space and Earth environment

99. The Subcommittee noted that the General Assembly, in resolution 47/67, had recommended that more attention be paid to all aspects related to the protection and the preservation of the outer space environment, especially those potentially affecting the Earth's environment. The Subcommittee also noted that the General Assembly had considered that it was essential that Member States pay more attention to the problem of space debris and had called for the continuation of national research on the question and for the development of improved technology for the monitoring of space debris.

100. The Subcommittee noted that the General Assembly had considered that, to the extent possible, information relating to the question of space debris should be provided to the Subcommittee in order to allow it to follow the question more closely, and had requested the Secretary-General to invite Member States to provide information on their national research on space debris to the Subcommittee. The Subcommittee took note of the information that had been submitted by Member States in response to that request and that was contained in document A/AC.105/542 and Add.1 and 2. The Subcommittee heard a special presentation on the question by an expert from France, as mentioned in paragraph 15 of the present report.

101. The Subcommittee reaffirmed the importance of reducing the generation of space debris and the need for further research concerning space debris, for the development of improved technology for monitoring space debris and for the compilation and dissemination of data on space debris. It further noted the importance of international cooperation in addressing those issues.

102. The Subcommittee noted that the General Assembly, in resolution 47/67, had considered that space debris could be an appropriate subject for in-depth discussion by the Committee on the Peaceful Uses of Outer Space in the future.

103. The Subcommittee agreed that information on national research on space debris should be provided to the Subcommittee, as in the past. This could be done through the provision of working papers, interventions in the general debate and technical presentations by specialists from Member States and international organizations.

104. The Subcommittee took note of a working paper submitted by Poland (A/AC.105/C.1/L.186) proposing that the Subcommittee request COSPAR to elaborate a report on the protection and preservation of outer space, especially concerning activities potentially affecting the Earth environment.

105. The Subcommittee requested that the Committee on the Peaceful Uses of Outer Space consider whether the question of space debris should be included on the Subcommittee's agenda for its next session.

D. Other reports

106. The Subcommittee welcomed the annual reports of WMO (A/AC.105/537 and A/AC.105/538), ESA (A/AC.105/539), INTELSAT (A/AC.105/540) and INMARSAT (A/AC.105/541) and the preliminary version of the thirty-second report of ITU on telecommunication and the peaceful uses of outer space. The Subcommittee requested those organizations to continue to report on their work.

107. The Subcommittee expressed its appreciation to COSPAR for its report on the progress of space research and to IAF for its report on highlights in space technology and applications, as contained in the publication "Highlights in Space: Progress in Space Science, Technology and Applications" (A/AC.105/522).

108. The Subcommittee noted with appreciation the participation in its session of representatives from United Nations bodies, specialized agencies and permanent observers, and found their statements and reports helpful in enabling the Subcommittee to fulfil its role as focal point for international cooperation in space.

E. Review of the future role and work of the Scientific and Technical Subcommittee

109. The Subcommittee recommended that the agenda of its thirty-first session include the following priority items:

(a) Consideration of the United Nations Programme on Space Applications and the coordination of space activities within the United Nations system;

(b) Implementation of the recommendations of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE 82);

(c) Matters relating to remote sensing of the Earth by satellites including, inter alia, applications for developing countries;

(d) Use of nuclear power sources in outer space.

110. The Subcommittee also recommended that the agenda of the thirty-first session include the following items:

(a) Questions relating to space transportation systems and their implications for future activities in space;

(b) Examination of the physical nature and technical attributes of the geostationary orbit; examination of its utilization and applications, including, inter alia, in the field of space communications, as well as other questions relating to space communications developments, taking particular account of the needs and interests of developing countries;

(c) Matters relating to life sciences, including space medicine;

(d) Progress in national and international space activities related to the Earth environment, in particular progress in the geosphere-biosphere (global change) programme;

(e) Matters relating to planetary exploration;

(f) Matters relating to astronomy;

(g) The theme fixed for special attention at the 1994 session of the Scientific and Technical Subcommittee: "Space applications for disaster prevention, warning, mitigation and relief".

111. The Subcommittee recommended that, regarding agenda item (g) in paragraph 27 above, COSPAR and IAF, in liaison with Member States, should be invited to arrange a symposium, with as wide a participation as possible, to be held during the first week of the Subcommittee's session, to complement discussions within the Subcommittee on the special theme.

112. With regard to the dates for the thirty-first session, the Subcommittee recommended that its session be scheduled from 22 February to 4 March 1994.

Annex I

DOCUMENTS BEFORE THE SCIENTIFIC AND TECHNICAL SUBCOMMITTEE AT ITS THIRTIETH SESSION

Item 1 - Adoption of the agenda

A/AC.105/C.1/L.185	Provisional agenda, with annotations, for the thirtieth session

Item 4 - United Nations Programme on Space Applications and the coordination of space activities within the United Nations system

Item 5 - Implementation of the recommendations of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space

A/AC.105/517	Information Systems on Space Science and Technology - A Directory
A/AC.105/520	Report and proceedings of the United Nations/International Astronautical Federation/Canada Workshop on Space Technologies for Development, organized in cooperation with the Government of Canada, 2-5 October 1991, Montreal, Canada
A/AC.105/521	Space activities of the United Nations and international organizations - A review of the activities and resources of the United Nations, its specialized agencies and other international bodies relating to the peaceful uses of outer space
A/AC.105/524	Coordination of outer space activities within the United Nations system: programmes of work for 1993 and 1994 and future years: report of the Secretary-General
A/AC.105/525	Report of the United Nations Workshop on Space Technology for Resource Development and Environmental Management, organized in cooperation with the Governments of Ecuador and Japan, 9-13 March 1992, Quito
A/AC.105/526	Report on the Second United Nations International Training Course on Remote-Sensing Education for Educators, held in cooperation with the Government of Sweden, 11 May-2 June 1992, Stockholm and Kiruna, Sweden

A/AC.105/527	Report of the United Nations/United States of America International Conference on Satellite Remote Sensing for Resource Management, Environmental Assessment and Global Change Studies: Needs and Applications of Developing Countries, 17-20 August 1992, Boulder, Colorado
A/AC.105/528	Report on the Fourth United Nations International Training Course on Remote Sensing Applications to Geological Sciences, co-sponsored by the Carl Duisberg Society, Berlin, in cooperation with the Government of Germany, 28 September-16 October 1992, Potsdam and Berlin, Germany
A/AC.105/529	United Nations/European Space Agency Training Course on the Use of Remote Sensing Systems in Hydrological and Agro-meteorological Applications, organized in cooperation with the Regional Centre for Services in Surveying, Mapping and Remote Sensing, 12-30 October 1992, Nairobi, Kenya
A/AC.105/530	Report on the Second United Nations/European Space Agency Workshop on Basic Space Science for Developing Countries, co-sponsored by the European Space Agency and the Planetary Society, organized in cooperation with the Governments of Costa Rica and Colombia and hosted by the University of Costa Rica, International Centre for Physics and University of the Andes, 2-13 November 1992, San José, Costa Rica, and Santa Fe de Bogotá, Colombia
A/AC.105/531	Report on the United Nations Workshop on Space Communications for Development, organized in cooperation with the Government of the Republic of Korea, 24-28 November 1992, Seoul, Republic of Korea
A/AC.105/532	Seminars of the United Nations Programme on Space Applications: selected papers on remote sensing, satellite communications and space science - 1993
A/AC.105/533	Report of the United Nations Expert on Space Applications to the Scientific and Technical Subcommittee
A/AC.105/534	Centres for Space Science and Technology Education: capability development in and data management for environmental assessment and natural resources management: updated project document
ACC/1992/28	Report of the Ad Hoc Inter-Agency Meeting on Outer Space Activities, held at UNESCO headquarters, Paris, 5-7 October 1992

Item 6 - Matters relating to remote sensing of the Earth by satellites, including, inter alia, applications for developing countries

Item 14 - The theme fixed for special attention at the 1993 session of the Scientific and Technical Subcommittee: "Space-based communication: the expansion of current services and increased understanding of new systems and the services they will make possible"

A/AC.105/535	See Working Group of the Whole to evaluate the implementation of UNISPACE 82, below
A/AC.105/536	See Working Group of the Whole to evaluate the implementation of UNISPACE 82, below

Item 7 - Use of nuclear power sources in outer space

A/AC.105/542 and Add.1 and 2	National research on space debris: safety of nuclear-powered satellites: problems of collisions of nuclear power sources with space debris
A/AC.105/C.1/L.187	Use of nuclear power sources in outer space: safety principles for nuclear power sources in space revisited: working paper submitted by the United Kingdom of Great Britain and Northern Ireland
A/AC.105/C.1/L.188	Use of nuclear power sources in outer space: working paper submitted by the Russian Federation
A/AC.105/C.1/WG.5/L.31	Draft report of the Working Group on the Use of Nuclear Power Sources in Outer Space on the work of its tenth session

Item 10 - Matters relating to life sciences, including space medicine

Item 11 - Progress in national and international space activities related to the Earth environment, in particular progress in the geosphere-biosphere (global change) programme

Item 15 - Other matters:

(a) Other reports

(b) Review of the future role and work of the Scientific and Technical Subcommittee

A/AC.105/445 and Add.5-9	Participation of the United Nations in International Space Year
A/AC.105/522	Highlights in space: progress in space science, technology and applications, 1992: reports submitted by COSPAR and IAF

A/AC.105/537	WMO Tropical Cyclone Programme: report by the World Meteorological Organization
A/AC.105/538	WMO satellite report: application of satellite technology: annual progress report 1991
A/AC.105/539	Report of the European Space Agency 1991
A/AC.105/540	Report of the International Telecommunications Satellite Organization (INTELSAT)
A/AC.105/541	International Maritime Satellite Organization (INMARSAT): annual review 1991
A/AC.105/C.1/186	Request to the Committee on Space Research of the International Council of Scientific Unions: working paper submitted by Poland

Working Group of the Whole to Evaluate the Implementation of the Recommendations of UNISPACE 82

A/AC.105/523 and Add.1	International cooperation in the peaceful uses of outer space: activities of Member States
A/AC.105/535	Applications of space technology for ocean resources development
A/AC.105/536	Applications of space technology for remote and rural communications and broadcasting
A/AC.105/C.1/WG.6/L.8	Draft report of the Working Group of the Whole to Evaluate the Implementation of the Recommendations of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space on the work of its seventh session

Annex II

REPORT OF THE WORKING GROUP OF THE WHOLE TO EVALUATE THE IMPLEMENTATION OF THE RECOMMENDATIONS OF THE SECOND UNITED NATIONS CONFERENCE ON THE EXPLORATION AND PEACEFUL USES OF OUTER SPACE ON THE WORK OF ITS SEVENTH SESSION

1. The Working Group of the Whole to Evaluate the Implementation of the Recommendations of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE 82) was re-established for its seventh session by the Scientific and Technical Subcommittee in accordance with General Assembly resolution 47/67 of 14 December 1992, paragraph 10, with a view to improving the execution of activities relating to international cooperation, particularly those included in the United Nations Programme on Space Applications, and to proposing concrete steps to increase such cooperation as well as to make it more efficient. The Working Group held a series of meetings from 18 to 25 February 1993, during the thirtieth session of the Scientific and Technical Subcommittee. At its meeting on 25 February 1993, the Working Group adopted the present report.

2. Mr. Muhammed Nasim Shah (Pakistan) was elected Chairman of the Working Group. The Chairman, in his opening statement, reviewed the mandate of the Working Group for its seventh session and the status of the implementation of the recommendations of UNISPACE 82.

3. In accordance with paragraph 10 of resolution 47/67, the Working Group of the Whole continued its assessment of the implementation of the recommendations of UNISPACE 82. The Working Group had before it a number of studies and reports prepared by the Secretariat, Member States and international organizations, contained in documents A/AC.105/523, A/AC.105/533, A/AC.105/535, A/AC.105/536, A/AC.105/539, A/AC.105/540 and A/AC.105/541.

4. The Working Group noted with satisfaction the valuable efforts of the United Nations, Member States and other international organizations to implement the recommendations of UNISPACE 82.

5. Bearing in mind that many of the UNISPACE 82 recommendations had not yet been fully implemented, the Working Group agreed on the following conclusions and recommendations, keeping in view the priorities contained in paragraph 9 of General Assembly resolution 47/67.

I. SHORT-TERM TRAINING AND LONG-TERM EDUCATION

6. The Working Group noted that training courses in remote sensing, satellite communications and other topics have been organized for the benefit of developing countries with the assistance of the United Nations. Such seminars and workshops on advanced applications of space science and technology and on new technological developments should continue to be

organized regularly. At the same time, the recent advances in space technologies and applications for development should be brought to the attention of planners, administrators and decision-makers in the developing countries. Member States, particularly the developed countries, and international organizations are requested to support the training programme on an ongoing basis.

7. The Working Group recommended that the emphasis of the United Nations Programme on Space Applications should remain on long-term, project-oriented, on-the-job training in space technology as well as in specific applications areas, with emphasis on new developments in satellite systems, software for remote sensing, use of digital processing systems and training in the management and operation of ground stations. In order to facilitate the development of indigenous research-and-development capabilities by the developing countries, the number of trainees from each country should be sufficient to create a national core group of experts. The Working Group noted with appreciation the offers of fellowships for long-term training made by some Member States and international organizations and urged other Member States and international organizations to make similar offers. The Working Group noted with concern that although UNISPACE 82 had recommended that at least 100 fellowships be available each year, the actual number of fellowships available has been far below that target and is currently less than 20 per cent of it. The Working Group urged the Office for Outer Space Affairs to make every effort to arrange for an increase in the number of fellowships and to encourage full utilization of the available fellowships.

8. The Working Group encouraged Member States to introduce or to improve space science, technology and applications curricula in their existing universities and institutions at appropriate levels.

II. INTERNATIONAL AND REGIONAL COOPERATION

9. The Working Group noted with appreciation the efforts being made by the United Nations towards the establishment in developing countries of regional centres for space science and technology education linked to institutions with space-related programmes, as described in the updated project document (A/AC.105/534). The Working Group noted that a number of countries in each region had offered to host the proposed centres, that a mission to evaluate potential host institutions had taken place in one region and that evaluation missions in other regions were planned. The Working Group considered that the process for selecting the host countries should take into account the need to ensure the long-term viability of the centres and the need for the participation and support of other countries in the region concerned. Bearing in mind the recommendations of UNISPACE 82, the Working Group urged the United Nations to continue its efforts to arrange funding and other support from the developed countries as well as from international organizations for the establishment and operation of the centres.

10. The Working Group recommended that in the light of the continued development of space activities, the Committee on the Peaceful Uses of Outer Space should request all States, particularly those with major space or space-related capabilities, to continue to inform the Secretary-General annually, as appropriate, about those space activities that were or could be the subject of greater international cooperation, with particular emphasis on the needs of the developing countries.

11. Similarly, the Committee should also request international organizations with space-related activities to continue to inform the Secretary-General annually concerning those space activities that were or could be the subject of greater international cooperation, with particular emphasis on the needs of the developing countries.

12. Extensive cooperation should be encouraged among countries within each region through sharing their human resources, technical expertise, hardware and software for space-related projects. If a country or countries within a region find it beyond their resources to undertake a programme by themselves, the United Nations should, upon request, endeavour to cooperate with them towards establishing a regional programme addressing the needs of those countries. Both regional and interregional cooperation between developing countries with similar needs, experiences and problems should be encouraged.

13. Encouragement should be given to governmental as well as non-governmental organizations which could help integrate regional and interregional efforts by means of conferences, publications and other activities, including symposia and meetings devoted to special topics, in order to facilitate and coordinate the space activities of scientific organizations. The United Nations should strengthen its cooperation with such organizations as part of its commitment to assisting developing countries to attain the benefits of space technology, including its spin-offs. Efforts should also be made by the United Nations to seek the cooperation of other international and regional bodies specializing in space activities.

14. Countries with relevant capabilities are once again encouraged to provide to the developing countries financial and technical assistance for developing low-cost community receivers for communication satellites and low-cost, preferably renewable, power sources to operate such receivers in unelectrified locations.

15. The Working Group noted with appreciation the reports prepared by the Office for Outer Space Affairs on the resources and technological capabilities of States in space activities as well as in the areas of education, training, research and fellowship opportunities for the promotion of cooperation in the peaceful uses of outer space. Those reports should continue to be periodically updated by the Office for Outer Space Affairs.

16. Given the investments already made on the ground by many countries in the form of ground stations, processing equipment, data banks, software, etc., for

remote-sensing data reception and analysis, satellite-operating States are urged to ensure the availability of data on a continued basis and in a form compatible with the current systems.

III. INFORMATION, STUDIES AND TECHNICAL ADVISORY SERVICES

17. The Working Group appreciated the preparation by the Secretariat of a number of studies and reports on space science, technology and applications as requested by the Working Group at its previous sessions. The Working Group recommended that some additional studies should be carried out to demonstrate the potentials of space technologies, with particular emphasis on the most recent advances in space technology and applications. Further studies might include the following:

(a) Use of low-Earth-orbiting satellites for communications;

(b) Forest resources management;

(c) Space applications for sustainable development;

(d) Satellite-based radio broadcasting services.

18. In order to promote the development of national space programmes, including higher education in space-related subjects, the United Nations should continue to arrange, upon request, for the provision of expert consultants from developed and developing countries to assist in the preparation of integrated national plans of action for initiating, strengthening or reorienting appropriate space applications programmes, which should be in conformity with other national development programmes. The Working Group noted with appreciation the efforts of the Office for Outer Space Affairs in the preparation of a list of experts in space technology and applications, on the basis of information provided by Member States and their national space authorities, to facilitate the exchange of consultants at the international level. That list should be periodically updated and circulated to the Member States.

IV. OTHER MATTERS

A. Priority areas

19. The Working Group considered that the following areas should be given priority in further efforts to promote the applications of space science and technology for development:

(a) Stimulation of the growth of indigenous nuclei and an autonomous technological base in space technology in developing countries. UNISPACE 82 had recommended the free exchange of scientific and technological information and an arrangement for the transfer of technologies to promote the use and

development of space technology in the developing countries. UNISPACE 82 had also recommended that countries should not place undue restrictions on the sale of components, sub-systems or systems required for peaceful space applications. A greater international understanding therefore needs to be evolved to overcome the difficulties faced by the developing countries in this respect;

(b) Promotion of greater exchange of actual experiences in space applications. UNISPACE 82 had recommended appropriate assistance and had called particularly upon international financial agencies to support demonstration projects to provide opportunities for hands-on experience in space technology and applications for the developing nations through direct involvement in such applications projects or pilot projects;

(c) United Nations funding. The Working Group regretfully noted that the budgetary allocations for the Programme on Space Applications for implementation of the recommendations of UNISPACE 82 have been meagre and inadequate in the past years and expressed its deep concern that the situation remains the same for the current year as well. The Working Group noted that in response to its recommendation and that of the Scientific and Technical Subcommittee on the issue at their previous sessions, the Committee on the Peaceful Uses of Outer Space had requested the General Assembly to make an adequate budget allocation for the Programme on Space Applications in order to fully implement the recommendations of UNISPACE 82. The Working Group further noted that that request had been accepted by the Special Political Committee of the General Assembly, communicated to the Fifth (Budgetary) Committee and noted by the General Assembly in its resolution 47/219 of 23 December 1992. The Working Group reaffirmed its view that the Programme on Space Applications should be given the full support of the United Nations in order to fully implement the recommendations of UNISPACE 82. This recommendation is made on the understanding that the Office for Outer Space Affairs will give priority to the full implementation of the Programme on Space Applications within the available resources of its regular budget;

(d) Voluntary contributions. The Working Group expressed its appreciation for the support from Member States and international organizations in the form of cash and in-kind contributions for the activities being undertaken by the Programme on Space Applications for the implementation of the UNISPACE 82 recommendations. The Working Group requested those Member States and international organizations to continue their support and urged other Member States and international organizations to provide cash and in-kind contributions for Programme activities.

B. Third UNISPACE Conference

20. Considering the benefits that have accrued as a result of UNISPACE 82, and noting that there have been considerable advances and changes in space technology and applications since 1982, as well as many changes in the geopolitical and economic situations affecting space programmes around the

globe, the Working Group recommended that it could be useful to address the potential for a third UNISPACE Conference. Noting that the General Assembly, in paragraph 20 of resolution 47/67, had recommended that Member States might discuss the possibility of holding such a conference, the Working Group recommended that the Committee at its next session address the question of such a conference under its agenda item "Other matters", considering its objectives and goals, and such aspects as organization, venue, timing, funding implications and other matters. The Working Group noted the proposals made that a third UNISPACE conference should be held in a developing country in the near future, suggestions that it could be held in 1995 and suggestions that the Working Group could serve as a Preparatory Committee for such a conference.

C. Future work

21. The Working Group recommended that it be reconvened next year to continue its work.

Annex III

REPORT OF THE WORKING GROUP ON THE USE OF NUCLEAR POWER SOURCES IN OUTER SPACE ON THE WORK OF ITS TENTH SESSION

1. The Working Group on the Use of Nuclear Power Sources in Outer Space, reconvened in accordance with General Assembly resolution 47/67 of 14 December 1992, paragraph 12, held its tenth session at United Nations Headquarters from 22 to 25 February 1993 under the chairmanship of Mr. J. H. Carver (Australia), during the thirtieth session of the Scientific and Technical Subcommittee.

2. The Working Group held 5 meetings and adopted the present report at its meeting on 25 February 1993.

3. The Working Group expressed its satisfaction that, on the basis of many years of work in the Committee and its subcommittees, the General Assembly had adopted a Set of Principles Relevant to the Use of Nuclear Power Sources in Outer Space, as contained in resolution 47/68 of 14 December 1992.

4. The Working Group noted that the Principles provided that they should be reopened for revision by the Committee on the Peaceful Uses of Outer Space no later than two years after their adoption.

5. Noting, inter alia, that space applications using nuclear power in space were continuing to develop, that international recommendations on radiological protection were continuing to evolve and that the adopted principles were limited in scope, the Working Group agreed that it was useful to consider how they might be revised. None the less, the Working Group noted that the Principles had been adopted by the General Assembly and would remain in their current form until such time as they were amended.

6. The Working Group considered that an incremental approach to revising the Principles should be considered.

7. The Working Group noted that the General Assembly, in paragraph 12 of resolution 47/67, had invited Member States to report to the Secretary-General on a regular basis with regard to national and international research concerning the safety of nuclear-powered satellites and that a number of Member States had submitted information as contained in document A/AC.105/542 and Add.1 and 2.

8. The Working Group took note of working papers submitted by the United Kingdom of Great Britain and Northern Ireland (A/AC.105/C.1/L.187) and the Russian Federation (A/AC.105/C.1/L.188) concerning safety aspects of nuclear power sources in space. The Working Group also took note of a paper circulated by Pakistan on risks and radiological consequences of debris collisions with nuclear power sources (S&T/1993/CRP.2). The Working Group agreed that the working papers and other information provided by Member States

provided a useful starting-point for discussions on possible revision of the Principles.

9. The Working Group considered a number of questions relating to possible ways of revising the Principles, including a further definition of terms, expanding the scope of the Principles to other uses of nuclear power in space, criteria for acceptable risk, the applicability of probabilistic risk assessment, the applicability of fundamental nuclear safety principles, the adoption of a safety culture by those carrying out nuclear-powered space activities, the effect of space debris on the safety of nuclear power sources and the application of the relevant recommendations of the International Atomic Energy Agency (IAEA) and the International Commission on Radiological Protection (ICRP).

10. The Working Group recommended that it be reconvened next year to continue its work.